PATENT SPECIFICATION

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Complete Accepted: Nov. 17, 1932.

COMPLETE SPECIFICATION.

Cutting Apparatus for Continuous Rod Cigarette Making Machines.

We, "UNIVERSELLE" CIGARETTEN-MASCHINEN-FABRIK J. C. MÜLLER & Co. (personally responsible partner JOHANN CARL MÜLLER), a German Company of 48—58, Zwickauerstrasse, Dresden-A, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

For the rod-cutters of cigarette-making machines there has been used a knife apparatus in which for cutting through the cigarette rod a circular knife is used which is driven by planet gearing. When, in this arrangement, the planet wheel is in the form of a cogwheel and the driven wheel mounted on the knife shaft is in the form of a counter cogwheel, experience has shown that with the great working speeds of modern machines it is not possible to obtain a constant, satisfactory operation, because quite apart from the natural wear and the wobble thereby produced, it is impossible to avoid the fracturing of teeth or the like owing to the unavoidable entrance of foreign bodies. Moreover, owing to the high speed, the cogwheels cannot be heavy, massive and particularly stable. A belt-drive has also been proposed, but experience has shown that it does not offer sufficient security against slip, and owing to the necessary high speeds cannot be adopted.

A friction-wheel drive has also been proposed and this offers the best solution, but it has been observed that it has the drawback that in order to maintain the frictional pressure in view of the radial adjustment of the knife shaft which becomes necessary, not only is too great an expenditure of power necessary but there is also a troublesome constructional design.

In contrast with these arrangements, the present invention consists in that, while employing a friction-wheel drive, the friction disc, which is secured against rotation, is arranged on a constantly rotating eccentric, which is mounted on a shaft to which the support for the knife shaft is attached.

Thus, by this arrangement the revoluble friction disc is not constrained, by the eccentric on which it is mounted, to make an eccentric movement, which in the course of one revolution is spread over the full 360°. According to the invention, this eccentric is employed for pressing the friction disc against the friction wheel of the knife-shaft.

According to a further feature of this invention, in order to facilitate the pressure adjustment against the friction wheel, if the knife shaft is radially adjusted in relation to the driving shaft, the support for the knife shaft is mounted eccentrically on the driving shaft, and the eccentric for the friction disc is mounted on the eccentric boss of the knife-shaft support in such manner that it may be turned, but can afterwards be fixed. Consequently, the two eccentrics can be displaced in relation to one another from the position where each neutralises the eccentricity of the other to the full throw of both eccentrics, and thus an exact radial adjustment of the knife shaft and at the same time an exact mutual adjustment of the friction wheel and the friction disc is obtained.

The invention is illustrated in the annexed drawings, in which:—

Fig. 1 shows the general arrangement of the invention, two eccentrics being employed.

Figs. 1a and 1b show in front and side elevation respectively an arrangement in which one eccentric only is employed.

Fig. 2 is a partial section of a cutting apparatus.

Fig. 3 is a side view.

First of all the present invention will be explained by means of the arrangement shown diagrammatically in Fig. 1. On the shaft a there is arranged the eccentric b. On this eccentric is mounted the friction disc c which is provided with an arm c^1. A pin c^{11} of this arm c^1 engages in a guideway d attached to the frame of the machine. On the eccentric there is also mounted the arm e, which carries the bearing for the shaft f. On the shaft f are mounted the friction disc g and the circular knife which has been omitted for the sake of clearness.

[Price 1/-]

Now when the shaft a turns with the eccentric b, the friction disc c is prevented from turning by the guideway d. The shaft f of the circular knife mounted on the arm e, by the action of the friction disc g remains in constant engagement with the friction disc c on which the disc g rolls. Now if the arm e is arranged in relation to the eccentric b in such manner that the point of contact x of the two friction discs c and g is located behind the point of greatest eccentricity of the disc c, then the mutual engagement of the two discs c and g can be maintained with certainty.

In the arrangement shown diagrammatically in Figs. 1a and 1b when the knife becomes worn its axle f can be moved radially outwards. In this case, it is merely necessary to loosen the nuts on the bolts s and to effect a corresponding adjustment of the eccentric b in relation to the axle a, this being facilitated by the provision of the oblong holes a^1 on the flange of the axle.

The adjustment of the eccentricity of the eccentric can, however, also be brought about, by arranging the latter on a further eccentric and then displacing both eccentrics in relation to one another. Such a form of construction is shown in Figs. 2 and 3.

On the driving shaft 1 is mounted the eccentric 2 which is connected with the box 4 by means of a dog-clutch 3, the purpose of which will be explained later. The box 4 is attached to the collar 1^1 of the driving shaft 1 by a dog clutch 5. On the eccentric 2 is mounted the eccentric 6 which corresponds to that denoted by b^1 in the form of construction illustrated in Fig. 1. This eccentric is provided with a ball bearing 7, which carries the friction ring 8, corresponding to the friction disc c shown in Fig. 1. This ring 8 is connected with the ring 9 by means of the screw 10. On the ring 9 a roller 11 is mounted which is held in a guideway 12 arranged radially to the shaft 1. This guideway 12 is fitted to the cover 13 of the housing. On the eccentric 6 is attached, by means of the screw 14, a support 15 for the knife-shaft. The knife-shaft 16 rests in the ball-bearings 17 of the support 15 and engages with the friction ring 8 by means of the friction disc 18.

In order that both eccentrics shall be retained relatively to one another in the adjusted position, the eccentric 2 is provided with teeth 19 with which suitable teeth cut in the ring 20 engage. This ring 20 is attached to the eccentric 6 by means of the screw 21. In an annular recess 6^1 of the eccentric 6 there is inserted a helical spring 22, one end of which rests against the eccentric 6 and the other against the collar 2^1 of the eccentric 2. Thus, if the nut 23 on the driving shaft 1 is loosened, the eccentric 2 in the opening in the eccentric 6, is thrust towards the left (Fig. 2), and the teeth 19 are disengaged. Now by suitable rotation of the eccentrics in relation to one another the eccentricity of the friction disc 8 can be changed, and by tightening the nut 23 these two eccentrics are again coupled together. At this point it should be mentioned that, in order to make the drawings clear, the two eccentrics are shown adjusted to their maximum eccentricity. If the machine is adjusted from the outset the circular knife 24 will be so selected that first of all the eccentrics are so adjusted that their eccentricity is first of all neutralised, that is the friction disc 8 remains at rest. Only when the circular knife 24 has become worn to a certain extent is an eccentricity produced by displacing the eccentrics in relation to one another, which eccentricity can be increased gradually in proportion to the wear of the circular knife.

In order to permit the adjustment of the counterweight 25 to correspond to the increasing eccentricity of the friction ring 8 and the consequent outward radial displacement of the knife support 15, to the eccentric 2 is connected a further eccentric 26, the eccentricity of which must, of course, be exactly opposite, that is to say diametrically opposite to the eccentricity of the eccentric 2. On this eccentric 26 is mounted the support 27 of the counterweight 25, and a locking disc 28 provided with a collar keeps the support 27 in position on the eccentric 26. On the support 27 there is mounted, by means of a bolt 29, the roller 30, which is held in a guideway 31 adjusted radially to the shaft 1. This guideway 31 is connected to the flange 6^{11} provided on the eccentric 6, by means of the screws 32.

The driving shaft 1 is mounted in the housing 35 by means of the ball-bearing 33 and the thrust bearing 34, which housing is closed on one side by the housing cover 36 and on the other side by the housing cover 13. A felt ring 37 inserted in an annular groove of the housing cover 13 serves as a packing member for the housing 35 which is filled with oil. On the shaft 1, and secured by the key 38 is mounted the worm wheel 39, which engages with the worm wheel 40. The latter is mounted on the shaft 41 which is mounted in the socket 42 for the cutting apparatus and is driven by the main driving shaft of the cigarette machine. Now the dog-clutch 3 serves to enable the cutting apparatus to be adjusted in correct relation to the cigar-

ette machine. By loosening the nut 23, the dog clutch 3 can be brought out of engagement. Now the cutting apparatus can be brought into the correct position by suitable rotation of the knife support in relation to the shaft 1.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Cutting apparatus for continuous rod cigarette-making machines, in which a circular knife is driven by a sun and planet movement by a non-rotating friction disc and a friction wheel mounted on the knife shaft, characterised in that the friction disc which is secured against rotation is arranged on a constantly rotating eccentric.

2. Cutting apparatus according to claim 1, characterised in that the eccentric is mounted on a shaft to which the support for the knife shaft is attached.

3. Cutting apparatus according to Claim 2, characterised in that the support for the knife-shaft is mounted eccentrically on the driving shaft, and that the eccentric for the friction disc is arranged on an eccentric boss of the knife-shaft support so that it can be adjusted and secured in position.

4. Cutting apparatus according to Claims 1—3, characterised in that the friction disc is arranged on the eccentric by the agency of a ball bearing.

5. Cutting apparatus according to Claims 1 and 3, characterised in that one eccentric, which is toothed, engages with corresponding teeth of another eccentric, and a helical spring is inserted in an annular groove located between the two eccentrics, which spring on the loosening of a nut on a shaft displaces the eccentrics relatively to one another in such manner that the teeth serving as couplings come out of engagement with one another.

6. Cutting apparatus according to Claims 1 and 3, characterised in that for the support of a counter-weight, a further eccentric is attached to the first eccentric in such manner that its eccentricity is diametrically opposite to the eccentricity of the first eccentric, and a roller attached to the support engages in a guideway attached to the flange, so that the diametrical position of the counter-weight in relation to the knife-shaft support is assured.

7. Cutting apparatus according to Claims 1—6, characterised in that the eccentric boss carrying the cutting apparatus is connected with the driving shaft by means of a dog clutch in such manner that the entire cutting apparatus can be withdrawn and rotated in relation to the continuous rod for the purpose of correct adjustment of the knife disc.

Dated this 28th day of October, 1931.

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Fig. 1

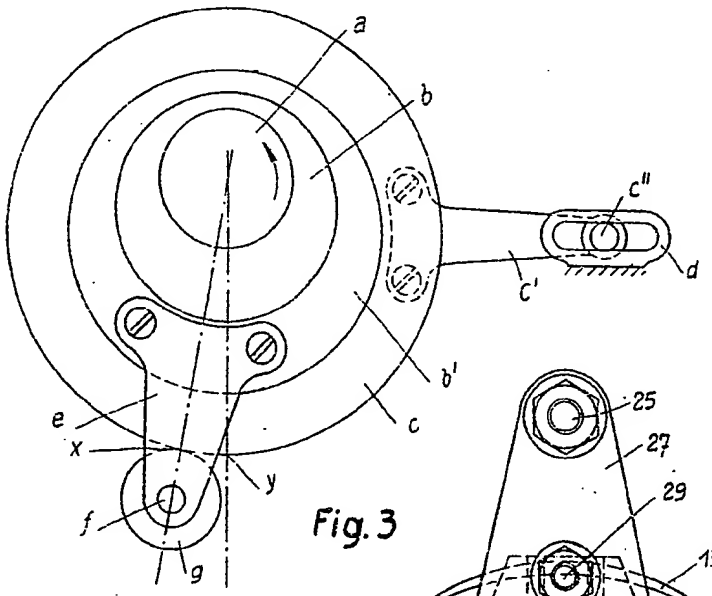
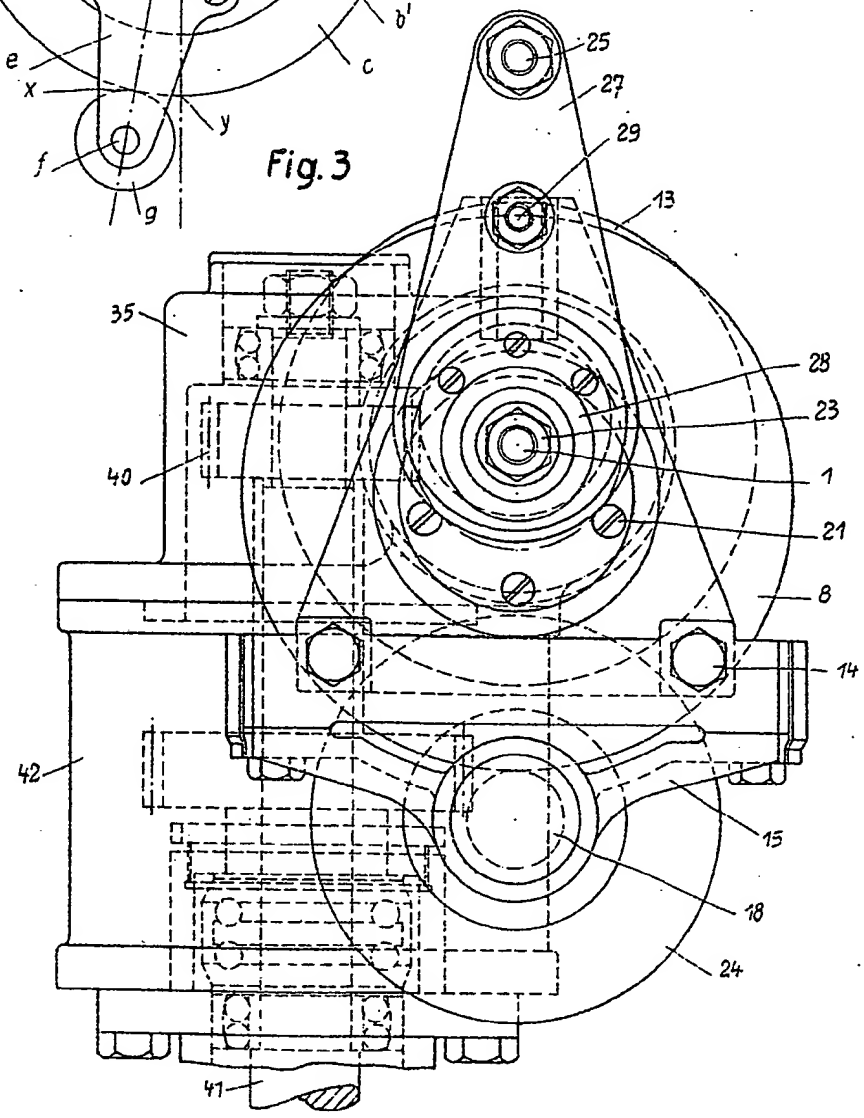


Fig. 3



SHEET 1

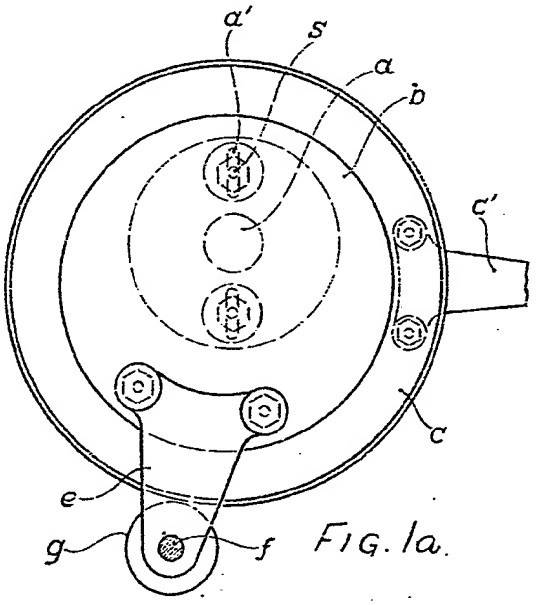


FIG. 1a.

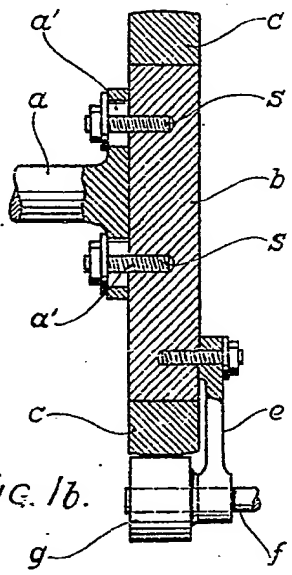


FIG. 1b.

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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1

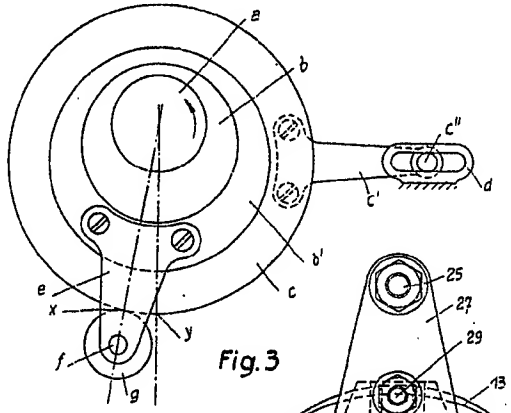
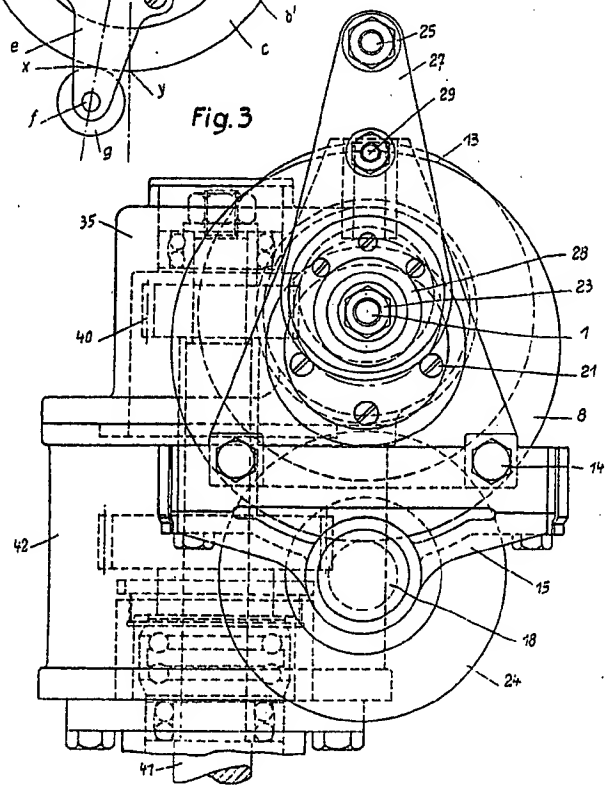


Fig. 3



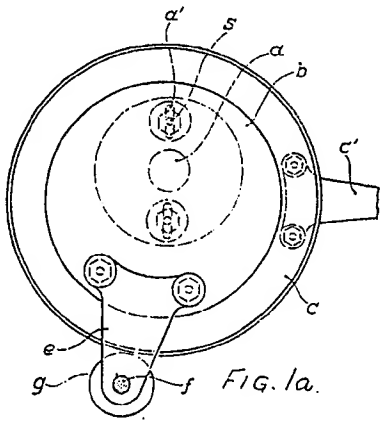


Fig. 1a.

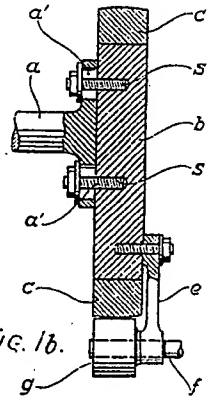


Fig. 1b.

Fig. 2

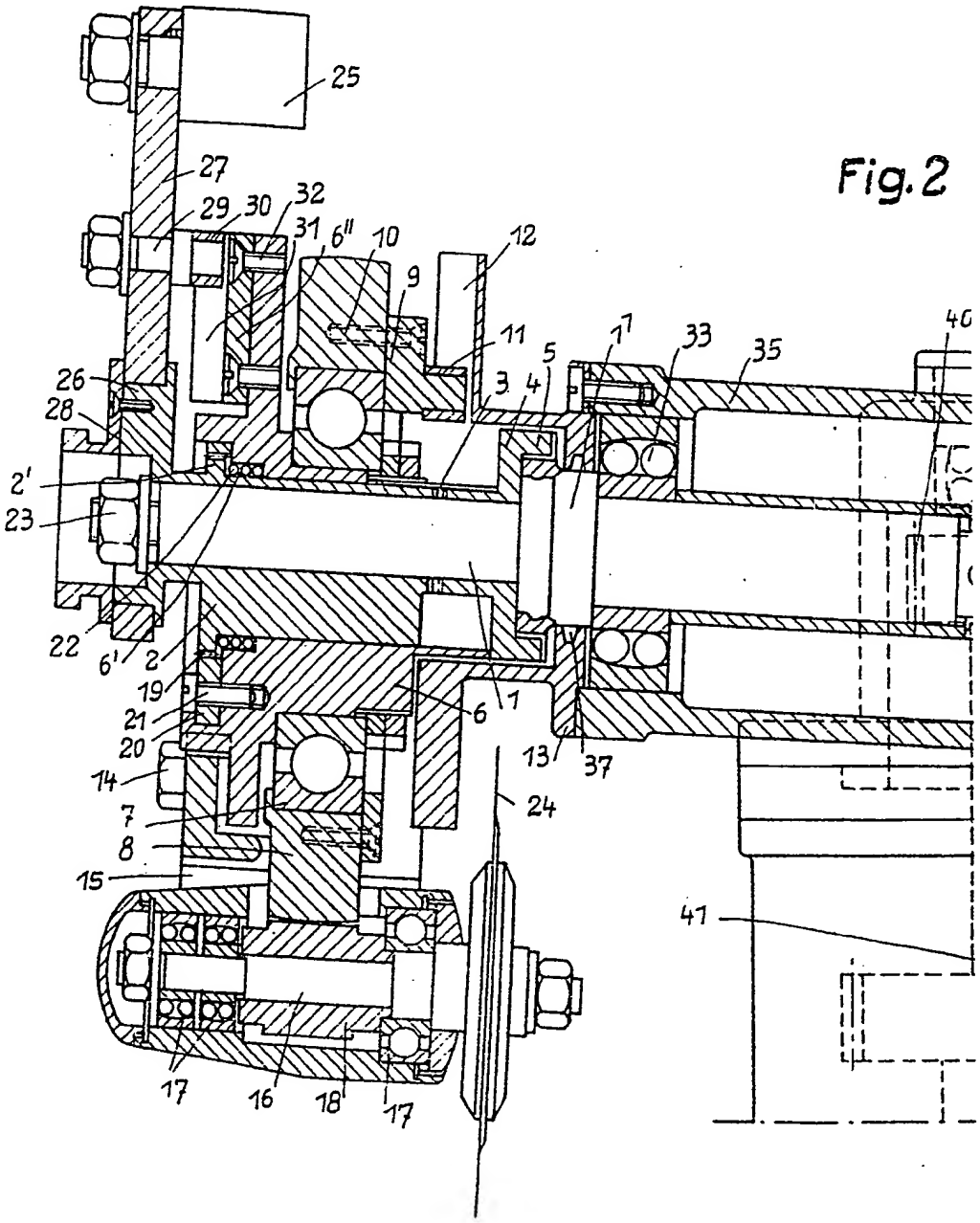


Fig. 2

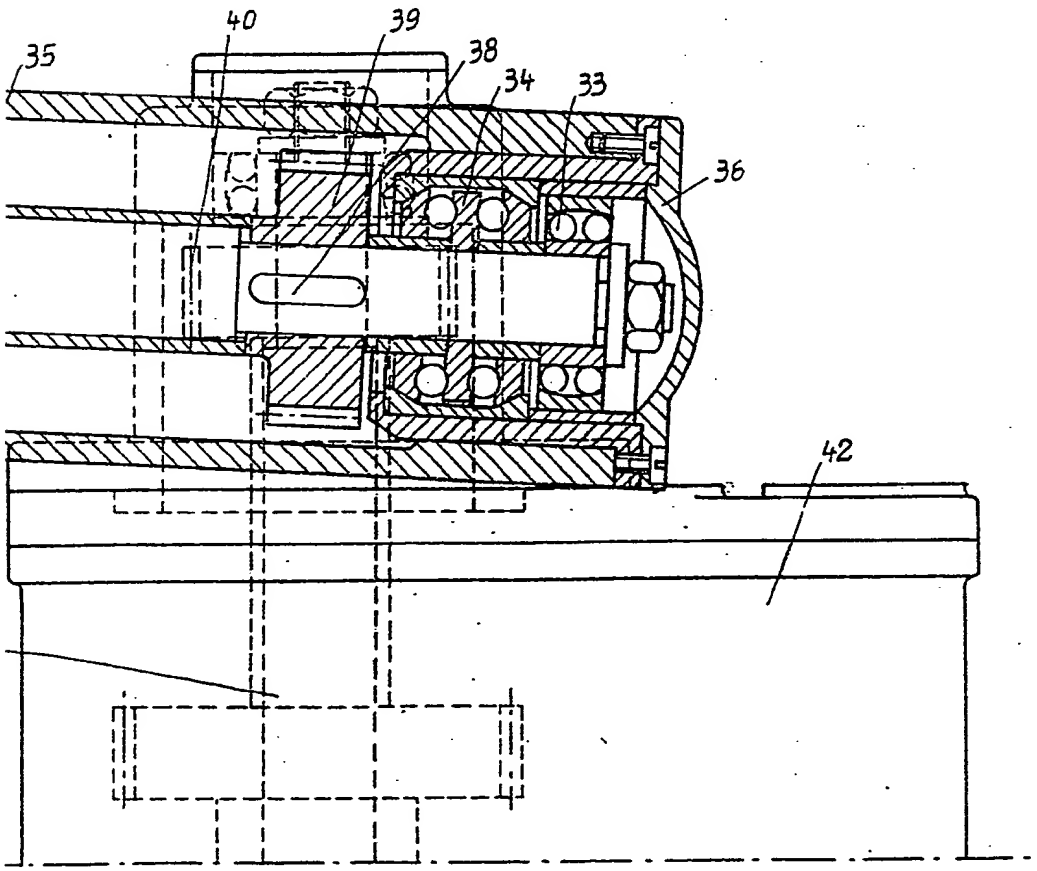


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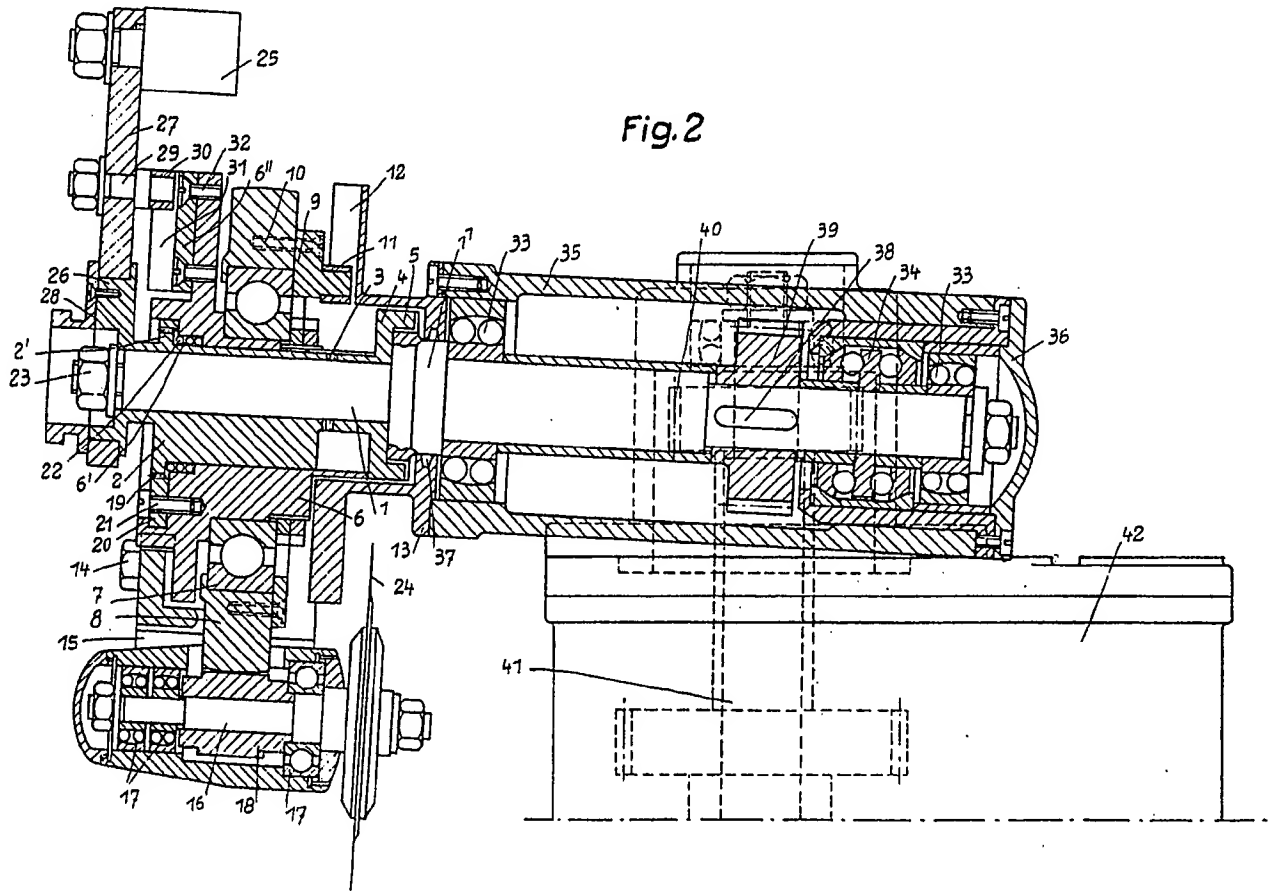
Fig. 2



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